KALAIGNAR KARUNANIDHI GOVERNMENT ARTS COLLEGE FOR WOMEN (AUTONOMOUS)

(Affiliated to Bharathidasan University, Thiruchirappalli & Re-accredited with B++ by NAAC)

PUDUKKOTTAI – 622 001

M.Sc COMPUTER SCIENCE

(Choice Based Credit System)

SYLLABUS (From 2021-2022 onwards)

M.Sc. COMPUTER SCIENCE

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DEPARTMENT OF COMPUTER SCIENCE

Board of Studies Meeting held on 29/3/2021 @ 11.00 a.m

Members of Board of Studies

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Subject Experts :

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Industrialist

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Faculty Member:

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KALAIGNAR KARUNANIDHI GOVERNMENT ARTS COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to Bharathidasan University & Re-accredited with B^{++} by NAAC)
PUDUKKOTTAI – 622 001
DEPARTMENT OF COMPUTER SCIENCE

Programme : M.Sc Computer Science

PROGRAMME OUTCOMES

Upon completion of M.Sc. Degree programme, the postgraduates will be able to

PO1: Elaborate advanced and contemporary concepts, principles, theories and advancements in relevant fields.

PO2: Execute critical investigation through various approaches, methods and evaluation strategies.

PO3: Utilize software tools and techniques to cope up with latest trends in technological development.

PO4: Compose the results of scientific work effectively, comprehend reports, design documentation and make effectual presentations.

PO5: Formulate professional, ethical and social values to excel as team leaders, entrepreneurs, administrators, educators and researchers.

PROGRAMME SPECIFIC OUTCOMES

Upon completion of M.Sc. Computer Science programme, the postgraduates will be able to

PSO1: Gain knowledge in fundamental concepts of Computer Science and practical competence in programming languages and open source platforms.

PSO2: Design and analyze precise specifications of algorithms, procedures and develop methodologies for software systems.

PSO3: Apply advanced techniques in various fields of Information Technology and innovate new ideas and solutions to existing problems.
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PSO4: Update themselves with the latest trends in technological development to pursue higher education and to become successful entrepreneurs.

PSO5: Transcribe techniques learned to skill sets necessary for competitive examinations or research and grab job opportunities in any field.

KALAIGNAR KARUNANIDHI GOVERNMENT ARTS COLLEGE FOR WOMEN(AUTONOMOUS), PUDUKKOTTAI

DEPARTMENT OF COMPUTER SCIENCE

M.Sc COMPUTER SCIENCE – GENERAL COURSE PATTERN

Sem	S.No	Code	Title of the Paper	Inst. Hrs	Credits	SE + CIA	Total
I	1	21PCS01	Core Course - I	6	5	75 + 25	100
	2	21PCS02	Core Course - II	6	5	75 + 25	100
	3	21PCS03	Core Course - III	6	5	75 + 25	100
	4	21PCS04P	Core Course - IV Practical	6	4	75 + 25	100
	5	21PCSE1	Elective - I	6	4	75 + 25	100
			TOTAL	**30**	**23**		**500**
II	6	21PCS05	Core Course - V	6	5	75 + 25	100
	7	21PCS06	Core Course - VI	6	5	75 + 25	100
	8	21PCS07	Core Course - VII	6	5	75 + 25	100
	9	21PCS08P	Core Course - VIII Practical	6	4	75 + 25	100
	10	21PCSE2	Elective - II	6	4	75 + 25	100
			TOTAL	**30**	**23**		**500**
		21PCSSS1 - Self Study Course 1		**-**	**2**		**100**
III	11	21PCS09	Core Course - IX	6	5	75 + 25	100
	12	21PCS10	Core Course - X	6	5	75 + 25	100
	13	21PCS11	Core Course - XI	6	5	75 + 25	100
	14	21PCS12P	Core Course - XII Practical	6	4	75 + 25	100
	15	21PCSE3	Elective - III	6	4	75 + 25	100
			TOTAL	**30**	**23**		**500**
		21PCSSS2 - Self Study Course 2		**-**	**2**		**100**
IV	16	21PCS13	Core Course - XIII	5	5	75 + 25	100
	17	21PCS14P	Core Course - XIV Practical	5	4	75 + 25	100
	18	21PCSE4	Elective - IV	6	4	75 + 25	100
	19	21PCSE5	Elective - V	4	4	75 + 25	100
	20	21PCS15PR	PROJECT	10	4	-	100
			TOTAL	**30**	**21**		**500**

KALAIGNAR KARUNIDHI GOVERNMENT ARTS COLLEGE FOR WOMEN(AUTONOMOUS), PUDUKKOTTAI
DEPARTMENT OF COMPUTER SCIENCE
M.Sc COMPUTER SCIENCE -COURSE PATTERN(2022 - 2023 onwards)

Sem	S.No	Code	Title of the Paper	Inst. Hrs	Credits	CIA	SE	Marks
I	1	21PCS01	Design and Analysis of Algorithms	6	5	25	75	100
	2	21PCS02	Distributed Data Base Systems	6	5	25	75	100
	3	21PCS03	Advanced Java Programming	6	5	25	75	100
	4	21PCS04P	Advanced Java Programming Practical	6	4	25	75	100
	5	21PCSE1	Core Elective I	6	4	25	75	100
			TOTAL	**30**	**23**			**500**
II	6	21PCS05	Data Mining	6	5	25	75	100
	7	21PCS06	Distributed Operating System	6	5	25	75	100
	8	21PCS07	Distributed Technologies	6	5	25	75	100
	9	21PCS08P	Distributed Technologies Practical	6	4	25	75	100
	10	21PCSE2	Core Elective II	6	4	25	75	100
			TOTAL	**30**	**23**			**500**
		21PCSSS1	Self Study Course – Software Project Management	-	2	-	-	100
III	11	21PCS09	Compiler Design	6	5	25	75	100
	12	21PCS10	Cloud Computing	6	5	25	75	100
	13	21PCS11	Wireless Networks	6	5	25	75	100
	14	21PCS12P	Smart Devices Programming Practical	6	4	25	75	100
	15	21PCSE3	Core Elective III	6	4	25	75	100
			TOTAL	**30**	**23**			**500**
		21PCSSS2	Self Study Course – Search Engine Optimization	-	2	-	-	100
IV	16	21PCS13	Big Data Analytics	5	5	25	75	100
	17	21PCS14P	Linux Practical	5	4	25	75	100
	18	21PCSE4	Core Elective IV	6	4	25	75	100
	19	21PCSE5	Core Elective V	4	4	25	75	100
	20	21PCS15PR	PROJECT	10	4	-	100	100
			TOTAL	**30**	**21**			**500**
			OVERALL TOTAL	**120**	**90 credits**			**2000 marks**

List of Core Courses :

Theory :

1. Design and Analysis of Algorithms
2. Distributed Data Base Systems
3. Advanced Java Programming
4. Data Mining
5. Distributed Operating System
6. Distributed Technologies
7. Compiler Design
8. Cloud Computing
9. Wireless Networks
10. Big Data Analytics

Practicals :

1. Advanced Java Programming Practical
2. Distributed Technologies Practical
3. Smart devices programming Practical
4. Linux Practical

List of Electives (Any 5 to be chosen from the list)

1. Artificial Intelligence
2. Machine Learning
3. Smart devices Programming
4. Cryptography and Network Security
5. Internet of Things
6. Open Source Technologies
7. Web Services

List of Self Study Courses :

1. Software Project Management
2. Search Engine Optimization

Courses	No. of Courses	Total Credits	Marks
Core Theory (10) + Practical(4)	14	66	1400
Elective	5	20	500
Project	1	4	100
Total	**20**	**90**	**2000**

Semester Wise Marks

Semester	I	II	III	IV	TOTAL
Hrs / Week	30	30	30	30	**180**
Credits	23	23	23	21	**90**
No. of Courses	5	5	5	5	**20**
Marks	**500**	**500**	**500**	**500**	**2000**

Maximum Marks for each Course:

	CIA	EXTERNAL
Theory	25	75
Practical	25	75

QUESTION PAPER PATTERN FOR M.Sc. COMPUTER SCIENCE

THEORY (for All Papers)

Part	Type	Qn. No.	Unit	Marks for each Question	Total Marks
A	Answer all the Questions	1 & 2	I	2	20
		3 & 4	II		
		5 & 6	III		
		7 & 8	IV		
		9 & 10	V		
B	Internal Choice - Answer all the Questions	11a / 11b	I	5	25
		12a / 12b	II		
		13a / 13b	III		
		14a / 14b	IV		
		15a / 15b	V		
C	Answer any three Questions	16	I	10	30
		17	II		
		18	III		
		19	IV		
		20	V		
External Marks					75
CIA					25
Max. Marks					100

EVALUATION PATTERN

CONTINUOUS INTERNAL ASSESSMENT PATTERN

THEORY:

Exam	Max. Marks	Converted to
Mid Semester	40	5
End Semester	40	5
Model Exam	75	5
Assignment	5	5
Seminar	5	5
Total Marks		**25**

PRACTICAL

Model Exam   : 15 Marks

Regular Practical Classes (Observation)   : 5 Marks

Viva   : 5 Marks

Total   **: 25Marks**

SEMESTER EXAMINATION

THEORY: 75 marks

PRACTICAL

Practical Exam   : 60 Marks

Record   : 10 Marks

Viva   : 5 Marks

Total   **: 75 Marks**

PROJECT :

Dissertation :   75 Marks

Viva voce   :   25 Marks

Scheme of Evaluation for Project		
Description	**Marks**	**Max. Marks**
Project Evaluation		
Selection of Project (Project Initiative)	20	
Project Design and Implementation of Source Code	20	**75**
Demonstration and Execution	20	
Documentation	15	
Viva-Voce		**25**
Total Marks		**100**

Passing Minimum for PG :

CIA	External	Aggregate
50%	50%	50%

CORE COURSE – I

DESIGN AND ANALYSIS OF ALGORITHMS (21PCS01)

Hours/Week : 6

Credits : 5

COURSE OBJECTIVES :

- To analyze the asymptotic performance of algorithms

- To develop divide and Conquer algorithms

- To create rigorous correctness proofs for Greedy algorithms

- To apply the backtracking and knapsack problems

- To remember and understand the traversal algorithm

UNIT -I

Algorithm Fundamentals :**Introduction :**Algorithm Definition – Algorithm Specification – Performance Analysis- Space Complexity – Time Complexity - Asymptotic Notations.
Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – PriorityQueues, Heaps, Heap Sort.

UNIT - II

The Greedy Method The General Method - Knapsack Problem - Job Sequencing With Deadlines -Minimum Cost Spanning Trees- Prims, Kruskal Algorithms - Optimal Storage on Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

UNIT- III

Dynamic Programming:The General Method – Multistage Graphs –All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - 0/1 Knapsack - The Traveling Salesperson Problem - Flow Shop Scheduling.

UNIT-IV

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: Least Cost search - 0/1 Knapsack Problem.

UNIT-V

NP hard and NP Completeness Problem: Basic Concepts – Cooks theorem – NP hard Graph Problems : Clique Decision Problem- Node cover Decision Problem- Chromatic Number Decision Problem – Directed Hamiltonian Cycle – Travelling Sales person Decision Problem – And / Or graph Decision Problem

Textbook:

1. " Fundamentals of computer Algorithms" - Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran - Second Edition - University Press India Pvt. Limited, 2007

Reference Books :

1. "Design and Analysis of Algorithms" –Dave and Himanshu , Pearson India publishers, 2nd Edition, 2013
2. "Designs and Analysis of Computer Algorithms" Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, Pearson Education 1999
3. Introduction to design and Analysis of Algorithms" - – Annoy Levitan – Pearson India Publihers - 3rd edition - 2017

Web References:

1. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
2. https://mrcet.com/downloads/digital_notes/IT/Design%20and%20Analysis%20Algorithms.pdf.

COURSE OUTCOMES:

Upon completion of the course "Design and Analysis of Algorithms" the students will be able to

#	Course Outcome
CO1	Analyze and differentiate the types of asymptotic notations
CO2	Learn and illustrate the divide and conquer method and greedy algorithms
CO3	Know and explain the dynamic programming method
CO4	Learn and tell Backtracking concepts
CO5	Know and disti nguish the Basic traversals

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
I	21PCS01	Design and Analysis of Algorithms		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓				✓	✓	✓		✓	✓
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓			✓	✓	✓	✓
CO4	✓	✓	✓			✓	✓			✓
CO5		✓	✓			✓	✓			✓
Number of Matches = 35 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

CORE COURSE II

DISTRIBUTED DATABASE SYSYTEMS (21PCS02)

Hours/Week : 6
Credits : 5

COURSE OBJECTIVES:

- To offer a thorough exposure to the design and manipulation of distributed database systems.
- To know about database fragmentation and allocation.
- To introduce the concepts of database security, concurrency and integrity.
- To gain in-depth knowledge on Reliability and Concurrency.
- To make a case-study of R* Project.

UNIT I:

Distributed Databases – An overview : Features of Distributed versus Centralized databases.

Principles of Distributed Databases : Reference Architecture for Distributed Databases – Types of data Fragmentation – Distribution Transparency for Read–only Applications – Distribution Transparency for Update Applications – Distributed Database Access Primitives – Integrity constraints in Distributed Databases.

UNIT II:

Distributed Database Design : A framework for Distributed Database Design – The design of Database Fragmentation – The allocation of Fragments. Optimization of Access Strategies : A framework for Query Optimization – Join Queries – General Queries

UNIT III:

The Management of Distributed Transactions : A Framework for Transaction Management – Supporting Atomicity of Distributed Transactions – Concurrency Control for Distributed Transactions.

Concurrency Control : Foundations of Distributed Concurrency Control – Distributed Deadlocks.

UNIT IV:

Reliability : Basic concepts – Non blocking Commitment Protocols – Reliability and Concurrency Control – Checkpoints and Cold Restart.

Distributed Database Administration: Catalog Management in Distributed Databases – Authorization and Protection.

UNIT V:

Distributed Database Systems : SDD-1 - A System for Distributed Databases: Architecture – Concurrency control – Execution of Queries – Reliability and Transaction Commitment.

The R* Project : Architecture of R* - Compilation, Execution and Recompilation of Queries – View management – Protocols for Data Definition and Authorization in R* - Transaction Management – Terminal Management.

Text Book :

1. "Distributed Databases – Principles and Systems " - Stefano Ceri , Giuseppe Pelagatti - McGraw Hill International, First edition, 2017.

Reference Books :

 1. "Databases and Transaction Processing : An Application-Oriented Approach" - Philip M. Lewis, Arthur Bernstein, Michael Kifer, Addison-Wesley, First edition, 2003.

2. "Fundamentals of Database Systems" - R. Elmasri and S.B. Navathe Addison Wesley, Third edition, 2004.

3. "Principles of Distributed Database Systems" - M. Tamer Özsu, Patrick Valduriez, Springer Science & Business Media, Third edition, 2011.

Webreferences:

1. https://www.tutorialspoint.com/distributed_dbms/distributed_dbms_databases.htm
2. https://www.tutorialride.com/distributed-databases/distributed-databases-tutorial.htm

COURSE OUTCOMES:

Upon completion of the course "Distributed Database Systems" ,the students will be able to

#	Course Outcome
CO1	Explain the basic concepts of Distributed Database.
CO2	Comment on distributed database design and query optimization.
CO3	Acquire skills in distributed transaction management.
CO4	Acquire in-depth knowledge on Reliability and Catalog Management.
CO5	Analyze the technological developments and applications of Distributed Database Systems.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
I	21PCS02	Distributed Database Systems		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓		✓	✓		✓	✓		✓	
CO2	✓	✓	✓	✓		✓	✓	✓	✓	
CO3	✓	✓	✓		✓	✓		✓		✓
CO4	✓	✓			✓	✓		✓		✓
CO5	✓		✓		✓		✓	✓	✓	✓
Number of Matches = 34 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

ADVANCED JAVA PROGRAMMING (21PCS03)

Hours/ Week : 6

Credits : 5

COURSE OBJECTIVES:

- To Understand the concept of Networking and Swing Controls.
- To Discuss JDBC API and the various types of JDBC drivers , create and execute SQL   Statements and RMI.
- To Explain the concepts of Java Servlets: Life cycle of Servlet , Cookies, Sesstion Tracking.
- To Develop programs using JavaScript Object.
- To Create animation and events based upon advanced Java Events concepts.

UNIT I :Networking : Networking Basics – Java and the Net – Inet Address – TCP/IP Client Sockets- URL – URL Connection – TCP/IP Sever Sockets - Datagrams.

Using AWT Controls, Layout Managers and Menus : Control Fundamentals – Labels – Using Buttons – Applying Check Boxes – Check Box Group - Choice Controls – Using Lists – Managing Scroll bars – Using a Text Field – Using a Text Area – Menu Bars and Menus.

UNIT II : **Java DataBase Connectivity :** JDBC/ ODBC Bridge – Java SQL Package – JDBC Exception Class – Connecting to remote database – Introduction to Java Remote Method Invocation(RMI).

UNIT III :Servlets : Background – Life Cycle of a Servlet – A Simple Servlet – The Servlet API – The javax.servlet package – Reading Servlet Parameters - The javax.servlet.http Package- Handling HTTP Requests and Responses – Using Cookies – Session Tracking.

UNIT IV

Javascript Objects : Introduction to Object Technology – Math Object – String Object – Fundamentals of Characters and Strings – Methods of the String Objects – Character Processing Methods – Searching Methods – Splitting Strings and Obtaining Substrings – XHTML Markup Methods – Date Object – Boolean and Number Object – Document Object – Window Object.

UNIT V

Events : Registering Event Handlers – Event Onload – Onmousemove – The Event Object and This – Rollovers with Onmouseover and Onmouseout – Form Processing with Onsubmit and Onreset – Event Bubbling.

Text Books :

1. "Java2 Complete Reference" - HerbertSchildt, Tata McGrawHill, 5th Edition, 2002
2. " Java2.0 (Web enabled commercial application development)"- Ivan Bayross – BPB Publication Indian Edition 2000(chapters 11,13,14, and 16 only)
3. "Web enabled commercial application development" - Ivan Bayross – BPB Publication Indian Edition 2000

Reference Books :

1. "The Complete Guide JAVA Database Programming JDBC, ODBC and SQL" – Mathew Siple – Tata McGraw Hill 1998.
2. "Pure JFC Swing " –Dr.SatyarajPantham – SAMS Techmedia Publications.

Web References :

1. https://www.edureka.co/blog/advanced-java-tutorial
2. https://www.javatpoint.com/what-is-advance-java

COURSE OUTCOMES:

Upon completion of the course "Advanced Java Programming", the students will be able to

#	Course Outcome
CO1	Develop client/server applications and TCP/IP socket programming and Swing-based GUI.
CO2	Discuss about Create, Update and retrieve the data from the databases using SQL and RMI.
CO3	Develop server side programs in the form of servlets.
CO4	Implement the concept of JavaScript Object.
CO5	Design the programs in Java Programming using JavaEvents.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
I	21PCS03	Advanced Java Programming		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔		✔		✔	✔	✔	✔	✔	✔
CO2	✔	✔	✔	✔		✔	✔	✔	✔	✔
CO3	✔	✔	✔				✔	✔	✔	✔
CO4	✔	✔	✔			✔	✔	✔		✔
CO5	✔		✔			✔	✔	✔		✔
Number of Matches = 37 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

CORE COURSE – IV P

ADVANCED JAVA POGRAMMING PRACTICAL (21PCS04P)

Hours / Week : 6

Credits   : 4

COURSE OBJECTIVES:

- To train the students to work on Applets
- To develop program using Cookie and its methods
- To communicate between processes using network sockets
- To write program using Java beans
- To develop server-side programming through servlets

1. Write a network program to implement Chat Server using Java.

2.Write a program in Java to implement FTP.

3. Write a program in Java to convert an image in RGB to a Grayscale image.

4. Create a Japplet using swing control, which will create the layout shown below and handle necessary events.

Format

Enter your Name: Enter your Age: Select your s/w: * Oracle *Visual Basic *Java   Select your city : *Delhi *Mumbai *Chennai   OK   Cancel

5. Use JDBC connectivity and create Table, insert and update data.

6. Write a program in Java to implement a Client/Server application using RMI.

7. Write a program in Java to create a Cookie and set the expiry time of the same.

8. Write a program in Java to create Servlet to count the number of visitors to a web page.

9. Write a program in Java to create a form and validate a password using Servlet.

10. Develop a Java Bean to demonstrate the use of the same.

Web References :

1. https://www.javatpoint.com/socket-programming

2. https://www.javatpoint.com/cookies-in-servlet

COURSE OUTCOMES:

Upon completion of the course "Advanced Java Programming Practical", the students will be able to

#	Course Outcome
CO1	Work with applets.
CO2	Design Program using swing controls.
CO3	Create Cookie and its life cycle.
CO4	Develop Servlets and work on it.
CO5	Develop programs using Java bean

CORE COURSE V

DATA MINING (21PCS05)

Hours/week : 6

Credits : 5

COURSE OBJECTIVES:

- To understand the basic concepts of Data Mining and Warehousing.
- To gain knowledge on data models and OLAP operations.
- To learn about various data mining techniques.
- To study association, clustering and classification algorithms in detail.
- To carry out in-depth study on the applications of data mining.
-

UNIT I : Introduction : Introduction – Data Mining. Data Warehousing : Introduction – Definition – Multidimensional Data Model – OLAP Operations – Warehouse Schema – Data warehousing Architecture – Warehouse server- Metadata – OLAP Engine – Data Warehouse backend process.

UNIT II : Data Mining : Introduction – KDD vs. Data Mining – DBMS vs. DM - DM Techniques – Issues and Challenges in DM – DM Application Areas. Association Rules : Introduction – Association Rule – Methods to Discover Association Rules – Apriori Algorithm – Partition Algorithm – Pincer-Search Algorithm – Dynamic Itemset Counting Algorithm.

UNIT III : Clustering Techniques : Clustering Paradigms – Partitioning Algorithms – k-Medoid Algorithms – Hierarchical Clustering – DBSCAN – BIRCH – CURE – Categorical Clustering Algorithms – STIRR – ROCK .

UNIT IV : Decision Trees : Introduction – Decision Tree – Tree Construction Principle – Best Split – Splitting Indices – Splitting Criteria – Rainforest – CLOUDS - BOAT – Pruning Technique. Other Techniques : Neural Networks – Learning in NN – Unsupervised Learning – Genetic Algorithms – Rough Sets – Support Vector Machines.

UNIT V : Web Mining : Web Mining – Web Content Mining – Web Structure Mining – Web Usage Mining – Text Mining. Temporal and Spatial Data Mining : Temporal Data Mining – Temporal Association Rules – Sequence Mining – The GSP Algorithm – SPADE – Event Prediction Problem – Time-series Analysis – Spatial Mining Tasks – Spatial Clustering.

Text Book :

 1. "Data Mining Techniques" – ArunK.Pujari, Universities Press (India) Private Limited, Third edition, 2013.

Reference Books :

1. "Introduction to Data Mining with Case Studies" – G.K.Gupta , Prentice Hall of India, Third edition, 2014.
2. "Data Mining : Concepts and Techniques" - Jiawei Han, MichelineKamber and Jian Pei, Third edition, 2011.
3. "Data Mining: Concepts and Techniques" - Han , Elsevier, Third edition, 2007.

Web References:

1. https://www.tutorialspoint.com/data_mining/index.htm
2. https://www.javatpoint.com/data-mining

COURSE OUTCOMES:

Upon completion of the course "Data Mining", students will be able to

#	Course Outcome
CO1	Explain fundamental concepts of data models and OLAP operations.
CO2	Understand various data mining techniques.
CO3	Discuss association and clustering algorithms and their applications.
CO4	Perform classification of real time data using decision trees.
CO5	Identify the latest trends and application areas of data mining.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
II	21PCS05	Data Mining		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔	✔		✔	✔	✔		✔	✔
CO2		✔	✔	✔		✔	✔	✔	✔	✔
CO3	✔	✔	✔		✔	✔	✔	✔	✔	✔
CO4	✔	✔	✔		✔		✔	✔	✔	✔
CO5	✔		✔	✔	✔	✔		✔	✔	✔
Number of Matches = 41 Relationship: Very High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

CORE COURSE VI

DISTRIBUTED OPERATING SYSTEM   (21PCS06)

Hours/week : 6

Credits   : 5

COURSE OBJECTIVES :

- To study the concepts of distributed computing systems and distributed computing environment.
- To design and develop the message passing.
- To understand distributed shared memory , consistency models and synchronization.
- To provide in-depth knowledge of distributed file system and security.
- To study the Basic commands in UNIX operating system .

UNIT I

Fundamentals: What is a Distributed Computing System – Evolution of Distributed Computing System – Distributed Computing System Models – Issues in Designing Distributed Operating System – Introduction to Distributed Computing Environment (DCE)

UNIT II

Message Passing: Introduction – Desirable features of a Good Message Passing System – Issues in IPC by Message Passing – Synchronization – Buffering – Process Addressing – Failure Handling – Group Communication.

UNIT III

Distributed Shard Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory.

Consistency Models: Implementing Sequential Consistency Models -Replacement Strategy – Thrashing –Heterogeneous DSM – Advantages of DSM.

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm.

UNIT IV

Distributed File System: Introduction – Desirable features of a Good Distributed File System – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions : Need for Transaction in a File Service-Operations for Transaction Based File Service-Recovery Techniques-Design Principles of DFS .

Security: Introduction – Potential Attacks to Computer System – Authentication – Access Control – Digital Signatures – Design Principles of Security

UNIT V:

UNIX Commands:

cal- cat- cd- chmod – date - df- kill – ls – man – mkdir – passwd – ls – ps – pwd – more / less – rm – who - grep.

Text Book :

1. Distributed Operating Systems – Concepts and Design, Pradeep K Sinha, PHI, 2003.
2. The Design of The Unix Operating System, Maurice J. Bach, Prentice Hall of India

Reference Book:

1. "Distributed Operating Systems" 1e, Andrew S Tanenbaum, Prentice Hall of India

Web References:
1. https://kb.iu.edu/d/afsk
2. https://www.tutorialspoint.com/unix/unix-useful-commands.htm

COURSE OUTCOMES :

Upon completion of the course "Distributed Operating System", the students will be able to

#	Course Outcome
CO1	Understand the concepts of distributed computing system.
CO2	Develop and interpret message passing.
CO3	Analyze the distributed shared memory.
CO4	Represent the distributed files system and security.
CO5	Describe UNIX commands

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
II	21PCS06	Distributed Operating System		6	5
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔			✔	✔		✔		
CO2	✔	✔	✔		✔		✔	✔	✔	
CO3	✔	✔	✔		✔	✔	✔			
CO4	✔	✔	✔	✔	✔	✔	✔			✔
CO5		✔		✔	✔		✔			✔
Number of Matches = 31 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

DISTRIBUTED TECHNOLOGIES (21PCS07)

Hours/week : 6

Credits : 5

COURSE OBJECTIVES :

- To Discuss and implement various server controls using ASP.NET
- To Analyze Web Server Controls and Validation Server Controls
- To Use appropriate data sources and data bindings in ASP.NET web applications
- To Discuss working with Master Page and Site Navigation.
- To Implement database connectivity using ADO.NET in window based application.

UNIT I :ASP.NET Fundamentals : Introducing ASP.NET – Evolution of ASP.NET.

ASP.NET Web Forms Structure : The ASP.NET Page Structure Options – ASP.NET Page Events – Dealing with Postbacks – Cross-page Posting – Global.asax.

ASP.NET Server Controls and Client-side Scripts :ASP.NET Server Controls – HTML Server Controls – Identifying ASP.NET Server Controls.

ASP.NET Web Server Controls : Overview of Web Server Controls - Labels – TextBox – Button – DropDown List – Image – ListBox – CheckBox – CheckBoxList – RadioButton– RadioButtonList.

UNIT II: ASP.NET Web Server Controls : Calendar – AdRotator – HiddenField – FileUpload – MultiView –View Server- ImageMap.

Validation Server Controls : Understanding Validation – Client-Side versus Server-Side Validation – ASP.NET Validation Server Controls - Required Field Validator, Range Validator, Compare Validator, Regular Expression Validator, Custom Validator, Validation Summary) – Turning Off Client-Side Validation.

UNIT III Data Binding : Data Source Controls – Data Bound Controls (GridView – ListView – FormView) - Other Data Bound Controls (TreeView, Menu, Chart) – Inline Data-Binding Syntax.

UNIT IV: Working With Master Pages : Need for Master Pages – Basics of Master Pages – Coding a Master Page – Coding a Content Page – Specifying Default Content in Master Pages – Programmatically Assigning the Master Page – Nesting Master Pages – Container – Specific Master Pages – Event Ordering.

Site Navigation : XML-Based Sitemaps – SiteMapPath – TreeView – Menu.

UNIT V: **Data Management with ADO.NET**: Basic ADO.NET features, Namespace and class, Connection Object, Command Object, DataReader object, DataAdapter, Using Parameters, Understanding Dataset and DataTable.

Text Book:

1. "Professional ASP.NET 4.5 in C# and VB" – Jason N.Gaylord, ChirstianWenz, Pranav Rastogi, Todd Miranda, Scott Hanselman – Wrox - Wiley India Pvt. Ltd.
2.

Reference Books:

1. " ASP.NET 3.5" – Walther –SAMS Publication, 2005.
2. Alex Mackey, Introducing .Net 4.0 with visual studio 2010, APress, USA, 2010.
3. "Beginning ASP.NET 4 in C#"- 2010 Mathew macdonald
4.

Web References :

https://www.tutorialspoint.com/asp.net/asp.net_introduction.htm

COURSE OUTCOMES :

Upon completion of the course "Distributed Technologies", students will be able to

#	Course Outcome
CO1	Recall the various types of server controls using ASP.Net and its Structure
CO2	Discuss different types of Web Server and Validation Server Controls
CO3	Analyze data sources and data bindings in ASP.NET web applications
CO4	Implement working with Master Page and Site Navigation
CO5	Implement data base connection using ADO.Net.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
II	21PCS07	Distributed Technologies		6	5
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔	✔		✔	✔	✔	✔	✔	✔
CO2	✔	✔	✔			✔	✔	✔	✔	✔
CO3			✔	✔	✔		✔	✔	✔	✔
CO4			✔	✔		✔		✔		✔
CO5		✔	✔	✔			✔	✔	✔	✔
Number of Matches = 36 Relationship:High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

DISTRIBUTED TECHNOLOGIES   PRACTICAL (21PCS08P)

Hours/week : 6

Credits   : 4

COURSE OBJECTIVES:

- To practice the web server controls of .net
- To design static web pages using dot net
- To gain knowledge about database connectivity
- To practice the disconnected data access of .net
- To develop program using the data controls of .net

1. Manipulating Server controls

2. Manipulating Login Form

3. Working with Validation Controls

       a) Compare Validator

       b) Range Validator

       c) Regular Validator

       d) Custom Validation

4. Calender Control

5. Working with Data Controls (Grid View, Details View, Form View, Repeater , Data List)

6. Connected Access

      a) DataBase Operations Using MS-Access

      b) DataBase Operations Using SQL Server.

7. Create a table and insert a few records using Disconnected Access.

8. Update and Delete records using Disconnected Access.

9. Generate Crystal Reports Using Existing Database.

10. MultiViewControl .

11. AdRotator Control

<u>Web References</u> :

1. https://www.tutorialspoint.com/asp.net/asp.net_tutorial.pdf
2. https://www.w3schools.com/asp/default.ASP

<u>COURSE OUTCOMES :</u>

Upon completion of the course "Distributed Technologies Practical ", students will be able to

#	Course Outcome
CO1	Gain Knowledge about the web server controls of .net
CO2	Design static webpages using .net
CO3	Develop projects using Database connectivity
CO4	Generate Crystal Reports
CO5	Use various controls of .Net

CORE COURSE - IX

COMPILER DESIGN (21PCS09)

Hours/week : 6

Credits : 5

COURSE OBJECTIVES :

- To Define the phases of compiler and apply Syntax Directed Translator
- To Identify the tokens to compute NFA, DFA and NFA from DFA
- To Apply Context free grammars to construct different types of parsers
- To Distinguish different types of syntax tree and storage organization
- To Describe the features of code Optimization

UNIT I

Introduction to Compilers : Compilers and Translators – Structure of Compiler – Compiler Writing Tools – Bootstraping.

Lexical Analysis : Role of Lexical Analyser – Regular Expression – Finite Automata – From Regular Expressions to Finite Automata – Minimizing the number of states of DSA - Implementation of Lexical Analyzer .

The Syntactic Specification of Programming Languages : Context Free Grammars – Derivation and Parse Trees.

UNIT II

Basic Parsing Techniques :   Parsers – Shift Reduce Parsing – Operator Precedence Parsing - Top Down Parsing – Predictive Parsers.

Automatic Construction of Efficient Parsers : LR Parsers – Constructing SLR Parsing Tables – Constructing Canonical LR Parsing Tables – Constructing LALR Parsing Tables – Using Ambiguous Grammars.

UNIT III

Syntax Directed Translation : Syntax Directed Translation Schemes – Implementation of Syntax Directed Translators – Intermediate Code – Postfix Notation – Parse Trees and Syntax Trees – Three Address Code, Quadruples and Triples – Translation of Assignment Statements – Boolean Expressions – Postfix Translations.

UNIT IV

Symbol Table : The contents of a symbol table – Data structures for Symbol Tables.

Run-time Storage Administration : Implementation of a Simple Stack Allocation Scheme – Implementation of Block Structured Languages.

Error Detection and Recovery : Errors – Lexical-phase errors – Syntactic-phase errors – Semantic Errors.

UNIT V

Introduction to Code Optimization : The principal sources of optimization – Loop optimization – The DAG representation of basic blocks.

Code Generation : Problems in code generation – Register allocations and assignment – Code Generation from DAG's – Peephole optimization .

Text Book:

1. "The Principles of Compiler Design" - Alfred V. Aho and Jeffred D. Ullman - Narosa Publishing House, 1987 (Chapters: 1, 3, 4, ,6, 7, 9, 10, 11, 12, 15).

Reference Book :

1. "Compilers, Principled and Tools", Aho and Ullman – Pearson Educatio- 2001 6th Edition

Web References :

1.https://www.tutorialspoint.com/compiler_design/index.htm

2. https://www.geeksforgeeks.org/compiler-design-tutorials/

COURSE OUTCOMES :

Upon completion of the course "Compiler Design ", students will be able to

#	Course Outcome
CO1	Explain the concepts of compiler and discuss the lexical analysis
CO2	Describe the functionality of Lexical and Syntax analysis
CO3	Illustrate the concepts of parser and its types
CO4	Define the storage organization and List the intermediate codes.
CO5	Summarize the working features of Code Generation

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
III	21PCS09	Compiler Design		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1		✓				✓	✓			
CO2			✓			✓		✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓			✓	✓	✓		
CO5	✓	✓	✓		✓	✓	✓	✓		✓
Number of Matches = 31 Relationship:High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

CORE COURSE - X

CLOUD COMPUTING (21PCS10)

Hours/week : 6

Credits : 5

COURSE OBJECTIVES :

- To impart the knowledge of a series of current cloud computing technologies, including technologies for IAAS, PAAS, SAAS.
- To learn the different layers of the cloud technologies, virtualization mechanisms, data security and scientific applications of cloud.
- To Discuss the various technologies, the Cloud computing architectures, applications and challenges
- To Summarize the hardware necessary for cloud computing.
- To Explain the various platforms of cloud in industry

UNIT I :

Foundations : Introduction to Cloud Computing :Cloud Computing in a Nutshell – Roots of Cloud Computing – Layers and types of Clouds –Desired features of a Cloud – Cloud Infrastructure Management – Challenges and Risks. Migrating into a Cloud: - Introduction – Broad Approaches – The Seven step model. Enriching the 'Integration as a Services' Paradigm for the Cloud Era: - Introduction – The Evolution of SaaS – The Challenges of SaaS Paradigm – Approaching the SaaS Integration Enigma – New Integration Scenarios – The Integration Methodologies – SaaS Integration Services.

UNIT II :

Infra Structure as a Service: Management of Virtual Machines for Cloud Infrastructures: - Anatomy of Cloud Infrastructures – Distributed Management of Virtual Infrastructures – Scheduling techniques for Advance Reservation of Capacity – Enhancing Cloud Computing Environments Using a Cluster as a Service: - Introduction – Related Work – RVWS Design – The Logical Design – Secure Distributed Data Storage in Cloud Computing: - Introduction – Cloud Storage from LANs to WANs – Technologies for Data Security – Challenges.

UNIT III

Platform and Software as Service (PAAS/IAAS) Aneka Integration of Private and Public Clouds : Introduction– Technologies and Tools – Aneka Cloud Platform - Aneka Resource Provisioning Service – Hybrid Cloud Implementation – CometCloud: An Autonomic Cloud Engine: - Introduction – CometCloud – Architecture – Autonomic Behavior of CometCloud – Overview of CometCloud-based Applications – Implementation and Evaluation.

UNIT IV

Platform and Software as Service(PAAS/IAAS) T-Systems Cloud based Solutions for Business Applications: Introduction – Enterprise Demand of Cloud Computing – Dynamic ICT Service – Importance of Quality and Security in Clouds – Dynamic Data CentreProducingBusiness-ready;Dynamic ICT Services. The MapReduce Programming Model and Implementations: - Introduction – MapReduce Programming Model – MapReduce implementations for the Cloud.

UNIT V:

Monitoring and Management: An Architecture for Federated Cloud Computing: Introduction – A typical Usecase – The Basic Principles of Cloud Computing – A Federated Cloud Computing Model – Security Considerations – Service Providers Perspective of SLA Management in Cloud Computing: - Traditional Approaches to SLO Management – Types of SLA – Life Cycle of SLA – SLA Management in Cloud –Automated Policy-based Management.

Text Book:

1. "Cloud Computing Principles and Paradigms"- RajkumarBuyya, James Broberg, AndrzejGoscinsky, Wiley India Pvt. Ltd., 2011.

Reference Books:

1. "Cloud Computing", Michael Miller, 1st Edition, Pearson Education Inc., New Delhi, 2008.
2. "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)" ,George Reese, O'Reilly, 2009.

3. "Cloud Computing Bible",BarrieSosinsky, 1st Edition, Wiley India Pvt. Ltd., New Delhi, 2011.

4. "Fundamentals of Cloud Computing", Prasant Kumar Pattnaik, ManasRanjanKabat, Souvik Pal, Vikas Publishing House, New Delhi, 2014.

5. "Cloud Computing: Implementation, Management and Security",Rittinghouse, John W., and James F. Ransome, CRC Press, 2017.

Web Reference:

1. https://www.guru99.com/cloud-computing-for-beginners.html
2. https://www.tutorialspoint.com/cloud_computing/index.htm

COURSE OUTCOMES:

Upon completion of the course "Cloud Computing ", Students will be able to

#	Course Outcome
CO1	Learn the key and enabling technologies that help in the development of cloud.
CO2	Develop the ability to understand and use the architecture of compute and storage cloud service and delivery models.
CO3	Explain the core issues of cloud computing such as resource management and security
CO4	Evaluate and choose the appropriate policies.
CO5	Monitor and manage cloud policy.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course			Hours	Credits
III	21PCS10	Cloud Computing			6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1		✓	✓			✓	✓			✓
CO2		✓	✓			✓	✓	✓		✓
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	✓	✓			✓	✓
CO5	✓		✓	✓	✓				✓	✓
Number of Matches = 34 Relationship:High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

WIRELESS NETWORKS   (21PCS11)

Hours/week : 6

Credits   : 5

COURSE OBJECTIVES :

- To Learn Wireless network technologies, protocols and standards.
- To Describe the fundamentals of 3G Services, its protocols and applications.
- To Compare the functions of Mobile transport Layer
- To Explain Network Architecture
- To Understand 4G Networks

UNIT - I

Wireless LAN: Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum - IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security – IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX

UNIT- II

Mobile Network Layer: Introduction – Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation, IPV6-Network layer in the internet- Mobile IP session initiation protocol – mobile ad-hoc network: Routing, Destination Sequence distance vector, Dynamic source routing

UNIT - III

Mobile Transport Layer: TCP enhancements for wireless protocols – Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility – Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, Transaction oriented TCP – TCP over 3G wireless networks.

UNIT -IV

Wireless WAN : Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture: 3G-MSC, 3G-SGSN, 3GGGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.

UNIT -V

4G Networks : Introduction – 4G vision – 4G features and challenges – Applications of 4G – 4G Technologies: Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems, Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.

Textbooks :

1. "Mobile Communications", Jochen Schiller - Second Edition2012 , Pearson Education. (UnitI,II,III)
2. "Wireless Communications and networking", Vijay Garg - First Edition2007 , Elsevier. (UnitIV,V)

Reference books:

1. "3G Evolution HSPA andLTE for Mobile Broadband."- Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, Second Edition, 2008, Academic Press.
2. "Modern Wireless Communications"- SimonHaykin , Michael Moher, David Koilpillai..
3. "Wireless Networking"- Anurag Kumar, D.Manjunath, Joy kuri. , First Edition, 2011 - Elsevier.

Web References :

1. https://www.techopedia.com/definition/26186/wireless-network
2. https://www.tutorialspoint.com/Wireless-Networks

COURSE OUTCOMES:

Upon completion of the course "Wireless Networks ", Students will be able to

#	Course Outcome
CO1	Compare the Wireless LAN Technologies
CO2	Acquire the Knowledge in 3G/4G and WiMAX networks.
CO3	Describe Wireless Network Architecture
CO4	Design and implement wireless network for any application
CO5	Analyze 4G Networks

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
III	21PCS11	Wireless Networks		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓			✓	✓	✓		
CO2	✓	✓		✓	✓	✓	✓	✓	✓	
CO3		✓	✓	✓	✓	✓		✓		✓
CO4		✓	✓	✓	✓		✓	✓	✓	
CO5	✓	✓	✓	✓	✓		✓	✓	✓	
CO6										
Number of Matches = 36 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

CORE COURSE – XII P

SMART DEVICES PROGRAMMING PRACTICAL (21PCS12P)

Hours/week : 6

Credits   : 4

COURSE OBJECTIVES:

- To Design simple programs using android
- To Create Programs using files
- To implement Layouts
- To learn about Progress bar and rating bar
- To Develop views

List of Programs:

1. Arithmetic operations.
2. Paint Operation
3. Reading Text file.
4. Implementation of layouts.
5. Using check boxes.
6. Implementation of rating bar.
7. Progress bar.
8. Change font size and color.
9. Implementation of calculator.
10. Views

Web References :

1. https://www.tutorialspoint.com/android/android_overview.htm
2. https://o7planning.org/10417/android-tutorial-for-beginners-basic-examples

COURSE OUTCOMES:

Upon completion of the course "Smart devices Programming Practical ", Students will be able to

#	Course Outcome
CO1	Develop simple android applications
CO2	Write programs using files
CO3	Implement check boxes and layouts
CO4	Design Progress bars
CO5	Create Views

CORE COURSE – XIII
BIG DATA ANALYTICS (21PCS13)

Hours/ Week : 5

Credits   : 5

COURSE OBJECTIVES

- To define the Big data types and challenges.
- To classify the characteristics of Big data
- To discuss the features of NoSQL , Mongo DB.
- To Know the Hadoop architecture
- To develop HodoopMapReduce and YARN.

UNIT I

Introduction to big data: Data, Characteristics of data and Types of digital data - Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment

UNIT II

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

UNIT III

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and itsneeds, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra.

UNIT IV

Hadoop foundation for analytics: History, Needs, Features, Key advantage andVersions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Keyaspects and Components of Hadoop, Hadoop architectures.

UNIT V

HadoopMapReduce and YARN framework: Introduction to MapReduce, Processingdata with Hadoop using MapReduce, Introduction to YARN, Components, Need andChallenges of YARN, Dissecting YARN, MapReduce application, Data serialization andWorking with common serialization formats, Big data serialization formats.

Text Book

1."Big Data and Analytics", Seema Acharya and SubhashiniChellappan, Wiley India Pvt. Ltd., 2016

Reference Books

1. "Big Data" by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. "Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics" by SoumendraMohanty, MadhuJagadeesh and HarshaSrivatsa, Apress Media, Springer Science + Business Media New York, 2013

Web References :

1. https://www.javatpoint.com/what-is-big-data
2. https://www.simplilearn.com/what-is-big-data-analytics-article

COURSE OUTCOMES

Upon completion of the course "Big Data Analytics ", Students will be able to

#	Course Outcome
CO1	Acquire the knowledge of Big Data Analytics.
CO2	Explain the importance and basic terminologies of Big Data Analytics.
CO3	Build the application of NoSQL , Mongo DB.
CO4	.Compare Hadoop with RDBMS
CO5	Analyze the Hadoop Architecture and YARN framework

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
IV	21PCS13	Big Data Analytics		5	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔		✔	✔	✔	✔		✔	✔
CO2	✔	✔	✔			✔	✔			
CO3	✔	✔	✔	✔	✔	✔	✔	✔	✔	
CO4	✔	✔		✔	✔	✔	✔	✔	✔	✔
CO5		✔	✔	✔	✔		✔	✔	✔	
Number of Matches = 38 Relationship:High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

LINUX PRACTICAL(21PCS14P)

Hours/week : 5

Credits   : 4

COURSE OBJECTIVES:

- To learn Basic Linux commands
- To develop Shell program to perform file operations
- To write program to manipulate directories
- To implement basic control structures
- To design user interface programs using menu

1. Write a menu driven shell program to do the following:

i. List of files, ii. Processes of Users, iii. Todays Date,iv. Users of system, v. Quit.

2. Write a shell program which accepts the name of a file from the standard input and then performs the following tests on it.

i. File existence, ii. File readable, iii. File Writable, iv. Both readable and writable.

3. Write a shell program to accept an input and check if the given input is a directory.

If it is a directory, then display the contents and revoke the execute permission for

group and others for all files starting with "a" in the directory.

4.Write a shell program using three arguments to take the pattern as well as input and output file names. If the pattern is found display "Pattern found", else display "Error message". Also check if right number of arguments are entered.

5. Write a menu driven shell program to copy, edit, rename, delete a file.

6. Write a menu driven shell program to perform the following tasks

i. Enter the sentences in file, ii. Search a given whole word in an existing file, iii. Quit.

7. Write a menu driven shell program for the following –

i. Passwd, ii ipconfig, iii ping

8.Write a shell program to find the number of ordinary files and directory files in the current directory.

9.Write a shell program to accept the name of the directory as command line argument and display the listing in that directory. By default, the "Home" directory"s contents should be displayed.

 10. Write a shell program to check whether the given number is prime or not.

11. Write a Shell Program to check the given number is Armstrong or not

12. Write a Shell Program to find the largest of three numbers.

13. Write a Shell Program to find factorial of the given number.

14. Write a Shell Program to reverse the given number.

15. Write a Shell Program to prepare an electricity bill.

16. Write a Shell Program to prepare a Mark Statement

17. Write a single program to sort the names in a file in alphabetical, and Reverse order.

Web References :

1.https://www.guru99.com/introduction-to-shell-scripting.html

2. https://www.javatpoint.com/linux-tutorial

COURSE OUTCOMES

Upon completion of the course "Linux Practical ", Students will be able to

#	Course Outcome
CO1	Develop programs using file manipulation commands
CO2	Design program using directory commands
CO3	Create programs with control structures
CO4	Implement Marksheet Processing
CO5	Write shell scripting for any manipulation

CORE COURSE XV

PROJECT (21PCS15PR)

Hours/Week   : 10

Credits   : 4

COURSE OBJECTIVES:

- To demonstrate the personal capability of a student
- To learn the industrial need
- To implement necessary tools for the problem
- To gain knowledge for document preparation
- To develop software as per the requirements

Guidelines

1. Students have to do the main project work individually in any organization.

2. Any applications either System Oriented or Application Oriented may be selected.

3. Attendance for the Project Reviews is mandatory

4. Students should strictly adhere to the schedule given

5. Online demonstration of the project should be done

6. Final Copy of the Project Report should be submitted to the Department.

COURSE OUTCOMES

Upon completion of the Project Work, Students will be able to

#	Course Outcome
CO1	Work in a team and communicate effectively
CO2	Carryout the feasibility study
CO3	Design the User interface
CO4	Develop software as per the customer requirement
CO5	Implement all testing strategies

ELECTIVE COURSE - I
ARTIFICIAL INTELLIGENCE

Hours/ Week : 6

Credits : 4

COURSE OBJECTIVES:

- To Summarize AI Techniques, Problem Space and Production System.
- To Learn the Heuristic Search techniques and Knowledge Representation.
- To familiarize the basic concepts in Predicate Logics and reasoning.
- To Examine the basic concepts of Symbolic and statistical reasoning.
- To Elaborate the Game Playing.

UNIT I

Introduction: AI Problems - AI techniques - Criteria for success.

Problems, Problem Spaces, Search: State space search - Production Systems.

UNIT II

Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First Search - Means-end analysis.

Knowledge representation : Representations and mappings -Approaches to Knowledge representations - Issues in Knowledge representations .

UNIT III

Using Predicate logic: Representing simple facts in logic - Representing Instance and Is a relationships - Computable functions and predicates - Resolution.

Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming - Forward Vs Backward reasoning

UNIT IV

Symbolic Reasoning under and Certainty: Introduction to Non Monotonic Reasoning – Logic for Non Monotonic Reasoning – Augmenting a Problem Solver .

Implementation: Depth – First – Search – Breadth – First – Search.

Statistical Reasoning: Probability and Bay's Theorem - Bayessian Network - Fuzzy Logic.

UNIT V

Game playing : The minimax search procedure – Adding Alfa – Beta Cutoffs – Additional Refinements – Iterative Deepening. .

Text Book:

1."Artificial Intelligence", Elaine Rich and Kevin Knight, Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.

Reference Books:

1. "Artificial Intelligence A Modern Approach" Stuart Russell, Peter Norvig - , Second Edition

2. "Artificial Intelligence Programming" Peter Norvig

Web reference:

   https://www.britannica.com/technology/artificial-intelligence

COURSE OUTCOMES :

Upon completion of the course "Artificial Intelligence ", the learners will be able to

#	Course Outcome
CO1	Analyse the AI Problem, AI Technique, Problem Space and Production system.
CO2	Illustrate the procedure of Heuristic search technique.
CO3	Explain the computable function and predicate logic
CO4	Develop Symbolic Reasoning and Statistical reasoning using Bay's Theorem, Bayesian network and Fuzzy logic .
CO5	Construct Game playing

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
-	-	Artificial Intelligence		6	4

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔	✔	✔	✔	✔	✔	✔		✔
CO2	✔		✔	✔		✔	✔	✔		✔
CO3	✔	✔		✔	✔	✔				
CO4	✔	✔	✔		✔		✔		✔	
CO5				✔	✔	✔	✔		✔	
Number of Matches = 32 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

ELECTIVE COURSE - II
MACHINE LEARNING

Hours/ Week : 6

Credits : 4

COURSE OBJECTIVES :

- To introduce basics of machine learning.
- To illustrate the concepts of Modelling and Evaluation
- To apply Bayesian concepts
- To classify the Supervised Learning and Unsupervised Learning
- To understand the basics of Neural Network.

UNIT I: Introduction to Machine Learning : Introduction - What is Human Learning? - What is Machine Learning? - Types of Machine Learning - Problems Not To Be Solved Using Machine Learning - Applications of Machine Learning - State-of-The-Art Languages/Tools In Machine Learning - Issues in Machine Learning

Preparing to Model : Introduction - Machine Learning Activities - Basic Types of Data in Machine Learning - Exploring Structure of Data - Data Quality and Remediation - Data Pre-Processing

UNIT II: Modelling and Evaluation : Introduction - Selecting a Model - Training a Model (for Supervised Learning) - Model Representation and Interpretability - Evaluating Performance of a Model - Improving Performance of a Model.

Basics of Feature Engineering : Introduction - Feature Transformation - Feature Subset Selection

UNIT III : Brief Overview of Probability : Introduction - Importance of Statistical Tools in Machine Learning - Concept of Probability – Frequentist and Bayesian Interpretation - Random Variables - Some Common Discrete Distributions – Some Common Continuous Distributions - Multiple Random Variables - Central Limit Theorem - Sampling Distributions - Hypothesis Testing - Monte Carlo Approximation

Bayesian Concept Learning : Introduction – Bayes' Theorem- Bayes' Theorem and Concept Learning - Bayesian Belief Network

UNIT IV **Supervised Learning : Classification:** Introduction - Example of Supervised Learning - Classification Model - Classification Learning Steps - Common Classification Algorithms

Supervised Learning : Regression : Introduction - Example of Regression - Common Regression Algorithms.

UNIT V:Unsupervised Learning: Introduction - Unsupervised vs Supervised Learning - Application of Unsupervised Learning - Clustering - Finding Pattern using Association Rule

Basics of Neural Network: Introduction - Understanding the Biological Neuron - Exploring the Artificial Neuron - Types of Activation Functions - Architectures of Neural Network - Learning Process in ANN - Backpropagation - Deep Learning

Text Book :

"Machine Learning", Subramanian Chandramouli, saikatDutt, Amir Kumar Das- Pearson Education India, 2018

Reference Books :

1. "Introduction to Machine Learning (Adaptive Computation and Machine Learning)" - EthemAlpaydin.The MIT Press. Stephen Marsland.2009

2. "Machine Learning: An Algorithmic Perspective.",CRC Press. Tom M. Mitchell, 2017- McGraw-Hill Education (India) Private Limited.

3. "Machine Learning – Hands on for Developers and Technical Professionals", Jason Bell, Wiley Publications.

Web reference:

https://www.tutorialspoint.com/machine_learning/machine_learning_tutorial.pdf

COURSE OUTCOMES :

Upon Completion of the Course "Machine Learning" the students will be able to

#	Course Outcome
CO1	List the Machine Learning activities
CO2	Develop a model for Transformation
CO3	Illustrate Bayesian Networks
CO4	Categorize Supervised and Unsupervised learning
CO5	Elaborate Neural Networks

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
		Machine Learning		6	4
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓				✓	✓				✓
CO2	✓	✓	✓			✓	✓	✓		
CO3	✓	✓	✓			✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Number of Matches = 36 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

SMART DEVICES PROGRAMMING

Hours/ Week : 6

Credits : 4

COURSE OBJECTIVES :

- To Introduce the concepts of Android and Eclipse installation
- To Illustrate the use of activities, fragment and intents
- To Understand the components of user interfaces and views
- To Model their own user interfaces and using views, pictures and menus
- To Demonstrate the necessity of data persistence, sharing and sending SMS and email programmatically.

UNIT I : Introduction to Android : Downloading and Installing Eclipse : Why Eclipse? – Downloading and Installing Eclipse – Downloading and Installing JRE.

Downloading and Installing the Android SDK : Downloading the Android SDK - Downloading and Installing the Android Plugin for Eclipse - Configuring the Android Plugin for Eclipse.

Exploring the Android SDK: What is in the Android SDK – Application Life Cycle.

Application: Hello World! Creating Your First Android Project in Eclipse - Examining the Android-Created Files - Hello World! Again- Hello World! Using an Image.

UNIT II: Activities, Fragments and Intents : Understanding Activities – Linking Activities using Intents – Fragments – Displaying Notifications.

UNIT III : Getting to know the Android User Interface : Understanding the Components of a Screen – Adapting Display Orientation – Managing Changes to Screen Orientation – Utilizing the Action Bar – Creating the User Interface Programmatically – Listening for UI Notifications.

Designing Your User Interface with Views:

Using Basic Views – Using Picker Views – Using ListView to Display Long Lists.

UNIT IV : **Displaying Pictures and Menus with Views** : Using Image Views to Display Pictures – Using Menus with Views – Using Web View.

Data Persistence : Saving and Loading User Preferences – Persisting Data Files – Creating and Using Databases.

UNIT V: **Content Providers :** Sharing Data in Android – Using a Content Provider.

Messaging :SMS Messaging : Sending SMS Messages Programatically – Sending SMS messages using Intents – Receiving SMS Messages – Caveats and Warnings – Sending emails.

Text Books :
1. "Android – A Programmer's Guide", J.F. DiMarzio -Mc-Graw Hill, 2008. (For Unit I)
2. "Beginning Android Programming with Android Studio, J.F. DiMarzio, Wrox Publications Fourth Edition, 2017. (For Units II – V)

Reference Books:
1. "Android Receipes – A Problem-Solution Approach", Dave Smith, Jeff Friesen – Apress 2011.
2. OnurCinar, Android Apps with Eclipse, Apress 2012. @ http://www.apress.com.
3. James C. Sheusi, Android Application Development for Java Programmers, Course Technology, 2013

Web reference

http://www.stet.edu.in/SSR_Report/Study%20Material/PDF/CA/PG/III%20YEAR/2-1.pdf

COURSE OUTCOMES

Upon Completion of the Course "Smart Devices Programming " the students will be able to

#	Course Outcome
CO1	Learn to create simple android programs with Eclipse.
CO2	Understand the significance of different concepts in android programming
CO3	Creating programs using different user interfaces and views
CO4	Illustrate the sharing of data in android
CO5	Send messages and email to different users.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
		Smart Devices Programming		6	4

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔			✔	✔	✔	✔		✔
CO2		✔	✔	✔			✔	✔	✔	✔
CO3	✔	✔	✔			✔	✔	✔		✔
CO4			✔	✔	✔	✔	✔	✔		✔
CO5			✔	✔	✔			✔	✔	✔
Number of Matches = 34 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

ELECTIVE COURSE - IV
CRYPTOGRAPHY AND NETWORK SECURITY

Hours/ Week : 6

Credits : 4

COURSE OBJECTIVES:

- To outline the concepts of security and encryption techniques.
- To illustrate DES and RSA algorithm.
- To discuss the principles of Remote User Authentication.
- To compare Transport Layer security and IP security.
- To Analyze the role of intruders, types of malicious software and firewalls.

UNIT - I

Overview: Security Concepts –OSI Security Architecture - Security Attacks – Security Services - Security Mechanisms – A Model for Network Security.

Classical Encryption Techniques : Symmetric Cipher model – Substitution technique – Transposition Technique – Rotor machines – Steganography.

UNIT- II

Block Ciphers and the Data Encryption Standards: Block Cipher principles - Data Encryption Standard – Strength of DES – Block Cipher Design Principles.

Public-Key Cryptography &RSA : Principles of public key cryptosystem – RSA Algorithm

UNIT- III

Key Management and Distribution : Symmetric Key Distribution using Symmetric Encryption - Symmetric Key Distribution using Asymmetric Encryption – Distribution of Public Keys.

User Authentication : Remote User Authentication Principles – Kerberos.

UNIT- IV

Transport Layer Security : Web Security Consideration – Secure Sockets Layer and Transport Layer Security – HTTPS –SSH.

IP Security: IP Security Overview – IP Security Policy - Encapsulating security payload.

UNIT- V

Intruders: Intruders- Intrusion detection – password management.

Malicious Software: Viruses and related threats

Firewalls : Firewall design principles – Trusted systems.

Text Book:

1." Cryptography and Network Security-Principles and Practices", William Stallings, Prentice-Hall, Fifth Edition, 2012

Reference Books:

1., "Introduction to Cryptography", Johannes A. Buchaman - Springer-Verlag.

2. "Cryptography and Network Security", Atulkahate , TMH

Web reference :

.1.http://www.sasurieengg.com/e-course-material/It-MCA/III-IT/3.IT2352Cryptography%20and%20Network%20Security.pdf

COURSE OUTCOMES:

Upon Completion of the Course "Network Security" the students will be able to

#	Course Outcome
CO1	Explain the concepts of security and encryption techniques.
CO2	Compare DES and RSA algorithm.
CO3	Elaborate the principles of Remote User Authentication.
CO4	Distinguish Transport Layer security from IP security.
CO5	Analyze the role of intruders, types of malicious software and firewalls

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course				Hours		Credits	
		Cryptography And Network Security				6		4	

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO 1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔	✔		✔	✔	✔	✔	✔	
CO2	✔	✔	✔				✔	✔	✔	✔
CO3		✔	✔	✔		✔	✔		✔	✔
CO4	✔	✔	✔			✔	✔	✔	✔	
CO5	✔	✔	✔	✔		✔	✔	✔	✔	✔
Number of Matches = 38 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

ELECTIVE COURSE - V
INTERNET OF THINGS

Hours/ Week :4

Credits : 4

COURSE OBJECTIVES:

- To Define the concept of Internet of Things and the technologies involved in it.
- To Demonstrate the shift from Machine to Machine to Internet of Things
- To Explore the technologies involved in M2M and IoT
- To Analyze the reference model architecture of IoT
- To Determine the technical and design constraints involved in IoT

UNIT I :

Introduction : Definition & Characteristics of IoT - Physical Design of IoT : Things in IoT, IoT Protocols - Logical Design of IoT : IoT Functional Blocks , IoT Communication Models , Communication APIs - IoT Enabling Technologies : Wireless Sensor Networks , Cloud Computing , Communication Protocols, Embedded Systems.

UNIT II:

From M2M to IoT – The vision : From M2M to IoT – From M2M towards IoT : the global Context .

From M2M to IoT – The Architectural Overview : Building an architecture – Main Design Principles and Needed Capabilities – An IoT Architecture Outline.

UNIT III:

M2M to IOT Technology Fundamentals: Devices and Gateways - Local and wide area networking – Data management – Business process in IOT – Everything as a service (XaaS) – M2M and IOT analytics – Knowledge Management.

UNIT IV :

Architecture Reference Model: Introduction, Reference Model and architecture - IoT reference Model (IoT Domain Model – Information Model – Function Model – Communication Model – Safety, Privacy, Trust, Security Model)

UNIT V :

Real-World Design Constraints: Introduction, Technical Design constraints-Data representation and visualization, Interaction and remote control.

The Smart Grid : Introduction - Smart metering – Smart House – Smart Energy City

Text Books:

1."Internet of Things – A hands - on approach", ArshdeepBahga, Vijay Madisetti, Universities Press, 2015 - (Unit I)

2. "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, 1st Edition, Academic Press, 2014. (Unit II to V)

Reference Books:

1. "Internet-of-Things (IoT) Systems", DimitirosSerpanos, Marilyn Wolf, Springer
2. "Internet of Things Principles and Paradigms", RajkumarBuyya, Amir VahidDastjerdi, Elsevier 2016.
3. "Building Blocks for IoT Analytics", John Soldatos, River Publishers, 2017

Web References :

1. http://uru.ac.in/uruonlinelibrary/Internet_of_Things/IOT.pdf
2. https://www.javatpoint.com/iot-internet-of-things

COURSE OUTCOMES :

Upon completion of the course "Internet of Things ", the learners will be able to

#	Course Outcome
CO1	Acquire the knowledge about basics of Internet of Things
CO2	Compare Machine to Machine technology with Internet of Things
CO3	Identify the technologies involved in M2M and IoT
CO4	Classify the reference models in IoT architecture
CO5	Understand the real world limitations in implementing IoT

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
		INTERNET OF THINGS		4	4

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔		✔	✔	✔	✔	✔	✔		
CO2	✔	✔			✔		✔	✔	✔	✔
CO3	✔		✔		✔	✔		✔	✔	✔
CO4	✔	✔		✔	✔	✔		✔	✔	
CO5	✔	✔		✔	✔	✔	✔	✔		
Number of Matches = 36 Relationship:High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

OPEN SOURCE TECHNOLOGIES

Hours/ Week :6

Credits   : 4

COURSE OBJECTIVES:

- To Understand the concept of Open Source Software
- To Explore Linux Commands
- To Provide knowledge about APACHE server
- To Create SQL tables and to do manipulations
- To Connect MySQL with PHP

UNIT I: OPEN SOURCE: Introduction : Open Source – Open Source vs. Commercial Software – What is Linux? - Free Software – Where I can use Linux? Linux Kernel.

UNIT II:LINUX Introduction: Linux Essential Commands – File system Concept - Standard Files - The Linux Security Model - Vi Editor - Partitions creation - Shell Introduction - String Processing - Investigating and Managing Processes - Network Clients.

UNIT III:APACHE: Introduction - Starting, Stopping, and Restarting Apache - Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation.

UNIT IV:MySQL Introduction to MY SQL - The Show Databases and Table - The USE command - Create Database and Tables - Describe Table - Select, Insert, Update, and Delete statement - Table Joins - Loading and Dumping a Database.

UNIT V:PHP PHP Introduction- General Syntactic Characteristics - PHP Scripting - Commenting your code - Primitives, Operations and Expressions - PHP Variables - Operations and Expressions Control Statement - Array - Functions - Basic Form Processing - File and Folder Access - Cookies - Sessions - Database Access with PHP - MySQL - MySQL Functions - Inserting Records - Selecting Records - Deleting Records - Update Records.

Text Book:

1. "Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", James Lee and Brent Ware, Dorling Kindersley(India) Pvt. Ltd, 2008

Reference book:

1. "Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together", Eric Rosebrock, Eric Filson, Published by John Wiley and Sons, 2004

Web References :

1. https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_open_source_software.htm
2. https://ittutorials.net/open-source/

COURSE OUTCOMES :

Upon completion of the course "Open Source Technologies ", the students will be able to

#	Course Outcome
CO1	Acquire the knowledge about Open Source Systems
CO2	Describe Linux commands
CO3	Learn APACHE environment
CO4	Classify MY SQL commands
CO5	Understand PHP scripts

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
III	21PCS07	OPEN SOURCE		6	5

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔		✔	✔	✔	✔	✔	✔		
CO2	✔	✔			✔		✔	✔	✔	✔
CO3	✔		✔	✔	✔	✔		✔	✔	✔
CO4	✔	✔	✔	✔	✔	✔	✔	✔	✔	
CO5	✔	✔		✔	✔	✔	✔	✔		
Number of Matches = 38 Relationship:High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

WEB SERVICES

Hours/ Week : 6

Credits   : 4

COURSE OBJECTIVES:

- To build real world application using web services
- To familiarize the concepts of SOAP
- To learn about UDDI
- To compare HTML and XML
- To Link XML with webpages

UNIT – I:Introduction-What are web services-SOAP-WSDL-UDDI Basic web services standards, technologies and concepts: XML fundamentals: Documents- Namespaces-schema-processing XML-Simple API for XML(SAX)-Document object model(DOM).

UNIT – II:SOAP and WSDL: The SOAP model-SOAP messages-SOAP encoding WSDL: Structure- The types element-Managing WSDL descriptions-Using SOAP and WSDL Service implementation and Invoking web services.

UNIT – III:UDDI: Introduction- UDDI specification - UDDI and lifecycle management.Conversation: Overview-web services conversation language-WSCL interface components.

Workflow: Business process management-workflows and workflow management.

Quality of Service: What is QoS- Why is QoS important for web services- QoS metrics for web services-QoS enabled web services. Mobile and Wireless mobile services- challenges with mobile.

UNIT – IV:XML and HTML:The limits of HTML-The scope of HTML-Structure-Structure and Content-Structure and Synthesis-Structure and Presentation-Representing Structure.

TheXML Language: Markup languages-Defining Markup Languages in XML.

UNIT – V:Linking in XML:Links(Information, Resources, and Hot Spots)-Link Management-Working withnames-Choosing the linking methodology.

XML Style: The publishing Process-At which stage do I structure my data?-Where do I process from one stage to the next?-When do I Convert?-Publishing data-Choosing a Client-side processing Application-Choosing a Server-side processing application

Text Book:

1. "Developing Enterprise Web Services: AnArchitects Guide", Sandeep Chatterjee, James Webber, Prentice Hall, Nov 2003

Reference book :

1.. "HTML 4 Unleashed" , Rick Darnell , Techmedia Publication, Second Edition,

Web references :

1. https://www.tutorialspoint.com/webservices/index.htm
2. https://www.guru99.com/web-services-tutorial.html

COURSE OUTCOMES :

Upon completion of the course "Web Services ", the students will be able to

#	Course Outcome
CO1	Acquire the knowledge of different web services
CO2	Describe SOAP models
CO3	Learn about QoS Standards
CO4	Classify XML Tags
CO5	Acquire knowledge about XML Stylesheets

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course		Hours	Credits
		WEB SERVICES		**6**	**4**

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✔	✔	✔		✔	✔	✔	✔	✔	✔
CO2		✔	✔	✔			✔	✔	✔	
CO3	✔	✔	✔	✔			✔	✔	✔	✔
CO4			✔	✔	✔	✔		✔	✔	
CO5			✔	✔	✔	✔		✔	✔	
Number of Matches = 35 Relationship: High										

Mapping	1-20	21-40	41-60	61-80	81-100
Matches	1-10	11- 20	21 - 30	31-40	41-50
Relationship	Very Poor	Poor	Moderate	High	Very High

SELF STUDY PAPER I

SOFTWARE PROJECT MANAGEMENT (21PCSSS1)

Credits : 2

COURSE OBJECTIVES :

- To define software economics.
- To classify various phases of Software Life Cycle.
- To discover project organizations and responsibilities.
- To discuss project control and process instrumentation.
- To categorize risk and analyze risk management.

UNIT I : SOFTWARE MANAGEMENT RENAISSANCE: Conventional Software Management – Evolution of Software Economics – Improving Software Economics – The Old Way and the New.

UNIT II : A SOFTWARE MANAGEMENT PROCESS FRAMEWORK: Life-Cycle Phases – Artifacts of the Process – Model-Based Software Architectures – Work Flows of the Process – Check Points of the Process.

UNIT III : SOFTWARE MANAGEMENT DISCIPLINES – I: Iterative Process Planning – Project Organizations and Responsibilities – Process Automation.

UNIT IV : SOFTWARE MANAGEMENT DISCIPLINES – II: Project Control and Process Instrumentation – Tailoring the Process.

UNIT V : RISK MANAGEMENT: Introduction – Risk – Categories of risk – A framework for dealing with risk – Risk Identification – Risk assessment – Risk Planning – Risk Management – Evaluating risks to schedule – Applying the PERT Technique – Monte Carlo Simulation – Critical Chain Concepts.

Text Book :

1. "Software Project Management : A Unified frame work" - Walker Royce - Pearson Education, 2002.

Reference Book:

1. "Software Project Management" - Bob Hughes & Mike Cotterell, rjib mall, 6th edition 2017, McGraw Hill Publication

Web references:

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. https://www.javatpoint.com/software-project-management

COURSE OUTCOMES :

Upon completion of the course, "Software Project Management", students will be able to

#	Course Outcome
CO1	Explain software economics.
CO2	Identify various phases of Software Life Cycle.
CO3	Discuss project organizations and responsibilities.
CO4	Illustrate project control and process instrumentation.
CO5	Compare categories of risk and analyze risk management.

SELF STUDY PAPER - II

SEARCH ENGINE OPTIMIZATION   (21PCSSS2)

Credits   : 2

COURSE OBJECTIVES :

- To outline the working of search engines.
- To compare on page and off page SEO.
- To analyze the importance of keywords in SEO.
- To explore Page Rank algorithm.
- To elaborate YouTube Search Engine optimization and algorithm.

UNIT I :

Search Engines – Popular Search Engines – Working of Search Engines – Crawling – Indexing – Searching – Search Engine Result Pages – robots.txt – Definition of Search Engine Optimization.

UNIT II :

SEO factors – On Page SEO – Off Page SEO – Difference between On Page and Off Page SEO.
On Page SEO Factors – Create SEO Content – Optimising your content – Advanced On Page Optimisation – On Page SEO Tools.

UNIT III :

Keyword Research Basics – Find Keyword Ideas – Analyze Keywords- Target Keywords – Prioritize Keywords – Keyword Research Tools.

UNIT IV :

Off Page SEO factors – Link – Authority – Anchor Text – Relevance – Social Signals – Page Rank Algorithm – HITS.

UNIT V :

Youtube Search Engine Optimisation – YouTube Search Engine Algorithm – Mobile SEO.

Web References:

1. www.moz.com
2. www.ahrefs.com
3. https://www.tutorialspoint.com/seo/index.htm
4. https://www.guru99.com/seo-tutorial.html

COURSE OUTCOMES :

Upon completion of the course, " Search Engine Optimization" ,students will be able to

#	Course Outcome
CO1	Recall the working of search engines.
CO2	Contrast on page SEO from off page SEO.
CO3	Evaluate the importance of keywords in SEO.
CO4	Illustrate Page Rank algorithm.
CO5	Summarize YouTube Search Engine optimization and algorithm.